

Docket No. F-8521

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REMARKS

Claims 1-24 are now pending in this application. Claims 1-16 are rejected. New claims 17-24 are added. Claims 1-4, 7-10, and 14 have been amended to be in better form. Claims 12 and 13 have been amended to clarify the invention.

Claims 12-13 and 15 have been rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The Office Action states on page 3 that the specification does not have support for the use of ammonia or a carbon-containing gas as an inert component (claims 12-13) and that pages 3-4 of the specification only disclose ammonia as the reactive component and do not make mention of a carbon-containing gas (claim 15).

The objected to language of claims 12-13 is similar to language of claim 4 (before the present amendment) and is fully supported by the claims as filed. Moreover, the objected to language in claims 12 and 13 includes the term "reactive gas" so it is clear that the ammonia and carbon-containing gas components are reactive. As for claim 15, a carbon-containing component used in the reaction is disclosed in various places of the specification including the last example and the claims as filed such as original claim 4. Accordingly, it is Applicants' position that there is support for claims 12, 13, and 15. Moreover, claims 12 and 13 have been amended to clarify the invention.

Claims 1-8 and 12-16 have been rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 6,303,760 (Dorn et al.). The Office Action states that

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the rejection is the same as in the Office Action of October 1, 2007. The Office Action argues that in Dorn et al., the nitrogen gas is the reactive component. The Office Action also states that the gas of Dorn et al. includes an ammonia or carbon-containing gas.

The present invention is different than that of the prior art. This can be seen by the fact that the present invention has much higher yields than the prior art. The present invention has yields of 50 to 95% (see page 2 of specification) while the yields of Dorn et al. are 3-5% (see page 1 of the specification). Thus, the present invention is different than that of Dorn et al. Moreover, the claimed invention includes a reactive gas as part of a method of synthesizing endohedral fullerenes in an arc reactor. The nitrogen gas disclosed in Dorn et al. is not a reactive gas. It is well-known that nitrogen gas is not a reactive gas. For example, please find attached an excerpt from Hawley's Condensed Chemical Dictionary which makes clear that nitrogen is chemically unreactive. The absence of proper explanation in Dorn et al. as to what is occurring is not a reason to reject the present invention which is different than that of Dorn et al.

Additionally, the reactive gas includes two chemical elements involved in the reaction, as is clear from the attached article *Endohedral nitride cluster fullerenes Formation and spectroscopic analysis of $L_{3-x}M_xN@C_{2n}$* , where the reaction of ammonia is demonstrated on page 311, in the middle of the right hand column and where it is shown how the two chemical elements of the reactive gas are involved in

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the reaction. The Enohedral nitride article shows a direct chemical reaction between the metal and the reactive gas (such as NH_3) to obtain the fullerenes. Such direct chemical reaction cannot occur in Dorn et al. because of the substances present in the reaction chamber. This further demonstrates the distinguishing characteristics of the present invention over the cited art.

Accordingly, at least for the aforementioned reasons, claims 1 and 14 are patentable over the cited art. Claims 2-8 and 12-16 are patentable at least for the reason that they depend from a patentable base claim. *See In re Fine*, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988).

Claim 5 recites the reactive gas component including ammonia or methane or other hydrocarbons. Dorn et al. fails to disclose such limitation. Although the Office Action states that Dorn et al. is not limiting with regards to the nitrogen source, this is insufficient to establish anticipation. Dorn et al. does not identify ammonia and therefore it cannot anticipate any claim which recites ammonia. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *See Verdegaal Brothers Inc. v. Union Oil Company of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). No such express or inherent disclosure is set forth in Dorn et al. Moreover, the Federal Circuit has made clear that a broad genus does not anticipate a narrow sub-genus. *See Atofina v. Great Lakes Chemical Corp.*, 78 USPQ2d 1417, 1423 (Fed. Cir. 2006). In the present case, ammonia is a species and is therefore not

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anticipated by Dorn et al. Accordingly, claim 5 is patentable for these reasons as well.

Claim 12 distinguishes over Dorn et al. since it recites ammonia as the reactive gas. Claim 13 distinguishes over Dorn et al. since it recites methane as the reactive gas.

Claim 9 has been rejected under 35 U.S.C. § 103(a) as obvious over Dorn et al. The Office Action states that the rejection is the same as in the Office Action of October 1, 2007. Claim 9 is patentable at least for the reason that it depends from a patentable base claim. *See In re Fine*, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988).

Claims 10-11 have been rejected under 35 U.S.C. § 103(a) as obvious over Dorn et al. in view of U.S. Patent No. 6,787,794 (Cain et al.).

The Office Action states on page 5 that Dorn et al. fails to teach modifying the graphite electrodes with a metal cyanamide and relies on Cain et al. for this teaching.

The Supreme Court has made clear that a claim composed of several elements "is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art" and stated the importance of identifying "a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does." *See KSR International Co. v. Teleflex Inc. et al.* 82 USPQ2d 1385, 1396 (2007). The Office

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Action fails to provide a reason why one of ordinary skill in the art would combine Dorn et al. and Cain et al. Accordingly, *prima facie* obviousness is absent.

Moreover, the Office Action does not demonstrate that ammonia and metal cyanamide are interchangeable. The statement that just because ammonia and metal cyanamide have pyramidal structures does not prove that they are interchangeable. One of ordinary skill in the art would readily know that ammonia and a metal cyanamide are very different. Thus, one of ordinary skill in the art would not interchange ammonia and metal cyanamide.

Additionally, Dorn et al. and Cain et al. disclose different kinds of fullerenes. Dorn et al. is directed to endohedral metallofullerenes (see title of Dorn et al.) while there is no disclosure that Cain et al. is directed to an endohedral metallofullerene. Furthermore, the metal in Dorn et al. is found in the graphite rods. In contrast, the ammonia of Cain et al. is not disclosed as being in the graphite rods. Accordingly, this further demonstrates that the two inventions are very different and one of ordinary skill in the art would not look at Cain et al. for ways to modify Dorn et al. The Office Action has not provided a reason for one of ordinary skill in the art to look at Cain et al. for components to add to a graphite rod. Additionally, claims 10 and 11 are directed to metal cyanamides while Cain et al. fails to disclose any metal cyanamides. Accordingly, *prima facie* obviousness is absent and claims 10 and 11 are patentable over the cited art.

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New claims 17-24 have been added and are patentable at least because they depend from patentable base claims and because the cited art does not disclose or suggest the limitations recited in claims 17-24.

New claims 17-24 are added and claims 1-4, 7-10, and 14 have been amended. Support for the new claims and for the claim amendments can be found in, for example, the claims as filed, the Examples, and page 2 of the specification.

Four claims in excess of twenty are added. **The fee of \$200.00 for the claim(s) is provided for in the charge authorization presented in the PTO Form 2038, Credit Card Payment form, provided herewith.**

Applicants respectfully request a one month extension of time for responding to the Office Action. **The fee of \$120.00 for the extension is provided for in the charge authorization presented in the PTO Form 2038, Credit Card Payment form, provided herewith.**

If there is any discrepancy between the fee(s) due and the fee payment authorized in the Credit Card Payment Form PTO-2038 or the Form PTO-2038 is missing or fee payment via the Form PTO-2038 cannot be processed, the USPTO is hereby authorized to charge any fee(s) or fee(s) deficiency or credit any excess payment to Deposit Account No. 10-1250.

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In light of the foregoing, the application is now believed to be in proper form for allowance of all claims and notice to that effect is earnestly solicited.

Respectfully submitted,
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Excerpt from Hawley's Condensed Chemical Dictionary, thirteenth edition, page 795.

Endohedral nitride cluster fullerenes Formation and spectroscopic analysis of $L_{3-x}M_xN@C_{2n}$, L. Dunsch et al., Journal of Physics and Chemistry of Solids (2004), pp. 309-315.